IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original): A method of detecting a motion vector between a plurality of frames of an image, the frames each including a plurality of blocks, the method comprising:

extracting a first block including a plurality of pixels from a first frame of the image;

detecting a second block from a plurality of blocks of a second frame of the image by block matching, the second block including the maximum number of pixels each indicating an absolute difference value not more than a first threshold with respect to each of the pixels of the first block; and

computing a first motion vector between the first block and the second block.

Claim 2 (Original): The method according to claim 1, which further includes:

extracting a third block including a plurality of pixels from the second frame;

detecting a fourth block from a plurality of blocks of the first frame by block matching, the fourth block including the maximum number of pixels each indicating an absolute difference value not more than a second threshold with respect to each of the pixels of the third block;

computing a second motion vector between the third block and the fourth block each of which includes the maximum number of pixels each indicating the absolute difference value not more than the second threshold;

comparing the maximum number of pixels of the second block and the maximum number of pixels of the third block;

selecting the first motion vector when the maximum number of pixels of the second block is larger than the maximum number of pixels of the third block; and

selecting the second motion vector when the maximum number of pixels of the third block is larger than the maximum number of pixels of the second block.

Claim 3 (Original): The method according to claim 1, which further includes:

detecting a third block from a plurality of blocks of a third frame between the first frame and the second frame by block matching with respect to the first frame, the third block including the maximum number of pixels each indicating an absolute difference value not more than the first threshold with respect to each of the pixels of the first block;

computing a second motion vector between the third block and the first block;

converting the second motion vector to a third motion vector toward the second frame from the third frame;

comparing the maximum number of pixels of the second block and the maximum number of pixels of the first block, each of the pixels of the first block and second block indicating the absolute difference value not more than the first threshold;

selecting the first motion vector when the maximum number of pixels of the second block is larger than the maximum number of pixels of the first block; and

selecting the second motion vector when the maximum number of pixels of the first block is larger than the maximum number of pixels of the second block.

Claim 4 (Original): The method according to claim 3, wherein the third frame is an interpolation frame between the frames.

Claim 5 (Original): The method according to claim 4, which further includes dividing the first block into a first region and a second region; and wherein the detecting includes detecting a first region block from the second frame by block matching, and detecting a

second region block from the second frame by block matching, and the computing includes computing a third motion vector between the first region and the first region block and a fourth motion vector between the second region and the second region block.

Claim 6 (Original): The method according to claim 5, which further includes extracting another first region block and another second region block from the second frame according to the third motion vector and the fourth motion vector, respectively, the another first region block corresponding to a locomotive point of a first region interpolation block of the interpolation frame that is on spatially the same location as the first region of the first frame and the another second region block corresponding to a locomotive point of a second region interpolation block of the interpolation frame that is on spatially the same location as the second region, and assigning the another first region block and the another second region block to the first region interpolation block and the second region interpolation block, respectively.

Claim 7 (Original): The method according to claim 3, wherein the converting includes making (k-n)/k times the second motion vector, where the third frame is m-th frame, the first frame is (m+k)-th frame, and the second frame is (m+n)-th, and $| n | > | k |$.

Claim 8 (Original): A method of detecting a motion vector between a plurality of frames of an image, the frames each including a plurality of blocks, the method comprising:

extracting a plurality of first blocks each including a plurality of pixels from a first frame of the image;

detecting a plurality of second blocks each including a plurality of pixels from a second frame of the image;

computing a plurality of first motion vectors between the first blocks and the second blocks;

counting the pixels of the second block each of which indicates a first absolute difference value not more than a first threshold with respect to each of the pixels of the first block to obtain a first count value;

scaling one of the first motion vectors according to an interval between the second frame and a third frame between the first frame and the second frame to obtain a second motion vector;

extracting from the third frame a third block to which the first block moves, according to the second motion vector;

counting pixels of the third block each of which indicates an absolute difference value not more than a second threshold with respect to each of the pixels of the first block to obtain a second count value;

computing a weighted additional value represented by r ($r = x \times p + (1-x)\, q$; $0 < x < 1$) where p and q indicate the first count value and the second count value respectively; and

extracting from the first blocks and the second blocks a pair of blocks having the maximum weighted additional value; and

selecting a vector between the pair of blocks as a motion vector between the first frame and the second frame.

Claim 9 (Original): A method of detecting a motion vector between a plurality of frames of an image, the frames each including a plurality of blocks, the method comprising:

extracting a plurality of first blocks each including a plurality of pixels from a first frame;

detecting a second block from a plurality of blocks of a second frame of the image by block matching, the second block including the maximum number of pixels each indicating an absolute difference value not more than a first threshold with respect to each of the pixels of one of the first blocks;

computing a first motion vector between the one of the first blocks and the second block as a first region motion vector between a first region of the one of the blocks and the second frame;

extracting pixels in the first block that the absolute difference value is not more than a second threshold as a pixel block of the first region;

extracting pixels in the first block that the absolute difference value is larger than the second threshold as a pixel block of a second region;

extracting a third block from the second frame of the image by block matching, the third block including the maximum number of pixels each indicating an absolute difference value not more than a third threshold with respect to each of the pixels of the pixel block of the second region; and

computing a second motion vector between the second region and the third block.

Claim 10 (Original): The method according to claim 9, wherein extracting the third block includes generating a first spatial expansion region connecting spatially between adjacent second regions in the first block, and extracting the third block including the maximum number of pixels each indicating the absolute difference value not more than the third threshold with respect to each of pixels of a pixel block of the first spatial expansion region.

Claim 11 (Original): The method according to claim 9, which further includes:

computing a third motion vector which is n times the second motion vector;

extracting from a third frame a third block that is a locomotive point of the pixel block of the second region according to the third motion vector;

extracting a fourth block from a fourth frame opposite to the second frame via the first frame by block matching, the fourth block including the maximum number of pixels each indicating an absolute difference value not more than a fourth threshold with respect to each of the pixels of the pixel block of the second region; and

computing a fourth motion vector between the second region and the fourth block;

computing a fifth motion vector which is n times the fourth motion vector;

extracting from a fourth frame a fourth block that is a locomotive point of the pixel block of the second region according to the fourth motion vector; and

computing respective absolute difference values of the second block, the third block, the fourth block and the fifth block; and

selecting one of the second motion vector and the fourth motion vector as a motion vector of the second region according to the absolute difference values of the second block, the third block, the fourth block and the fifth block.

Claim 12 (Original): The method according to claim 9, which includes filtering the pixel block of the first region using a spatial region low pass filter.

Claim 13 (Original): A method of detecting a motion vector between a plurality of frames of an image, the frames each including a plurality of blocks, the method comprising:

extracting from a first frame a plurality of first blocks each having brightness information and color difference information;

extract from a second frame a plurality of second blocks each having brightness information and color difference information;

computing a first absolute difference value between opposite pixels of a first brightness block having the brightness information of the first blocks and a second brightness block having the brightness information of the second blocks;

computing a second absolute difference value between opposite pixels of a first color difference block and a second color difference block, the first color difference block having the color difference information of the first blocks whose first absolute difference is not more than a first threshold and the second color difference block having the color difference information of the second blocks whose first absolute difference value is not more than the first threshold;

counting pixels that the second absolute difference value is not more than a second threshold to obtain a first count value;

extracting from the first blocks and the second blocks a pair of blocks each including pixels that the first count value is maximum;

computing a vector between the pair of blocks as a first region motion vector between a first region in one of the first blocks and the second frame;

extracting pixels in the first block that the second absolute difference value is not more than the second threshold as a pixel block of the first region;

extracting pixels in the first block that the second absolute difference value is larger than the second threshold as a pixel block of the second region;

extracting from the second frame a third block corresponding to the pixel block of the second region;

computing a third absolute difference value regarding brightness of opposite pixels of the pixel block of the second region and the third block;

counting pixels that the third absolute difference value is not more than a third threshold to obtain a second count value;

extracting from the pixel block of the second region and the third block a pair of blocks each including pixels that the second count value is maximum; and

selecting a vector between the pair of blocks as a second region motion vector between the second region and the second frame.

Claim 14 (Original): A method of forming an interpolation image to be interpolated in a third frame between a first frame and a second frame, the method comprising:

extracting from the first frame a first block including a plurality of pixels;

detecting a second block from a plurality of blocks of a second frame of the image by block matching, the second block including the maximum number of pixels each indicating an absolute difference value not more than a first threshold with respect to each of the pixels of the first block;

computing a first motion vector between the first block and the second block;

extracting pixels in the first block that the absolute difference value is not more than a second threshold as a pixel block of the first region;

extracting pixels in the first block that the absolute difference value is larger than the second threshold as a pixel block of the second region;

extracting a third block from the second frame of the image by block matching, the third block including the maximum number of pixels each indicating an absolute difference value not more than a third threshold with respect to each of the pixels of the pixel block of the second region;

computing a second motion vector between the second region and the third block;

scaling the first motion vector and the second motion vector according to a temporal position of the third frame;

extracting an interpolation block and a fifth block according to the scaled motion vector, the interpolation block being on the third frame that is at spatially the same position as the block on the first frame and the fifth block corresponding to a locomotive point of a region interpolation block on the third frame that is at spatially the same position as the pixel block; and

forming the interpolation image allocating the fifth block to the interpolation block of the third frame and the region interpolation block.

15 (Original): The method according to claim 14, which further includes:

extracting a third block including a plurality of pixels from the second frame;

detecting a fourth block from a plurality of blocks of the first frame by block matching, the fourth block including the maximum number of pixels each indicating an absolute difference value not more than a second threshold with respect to each of the pixels of the third block;

computing a second motion vector between the third block and the fourth block,

comparing the maximum number of pixels of the second block and the maximum number of pixels of the third block;

selecting the first motion vector when the maximum number of pixels of the second block is larger than the maximum number of pixels of the third block; and

selecting the second motion vector when the maximum number of pixels of the third block is larger than the maximum number of pixels of the second block.

Claim 16 (Original): A method of displaying an image, comprising:

extracting from a first frame of an original image a first block including a plurality of pixels;

detecting a second block from a plurality of blocks of a second frame of the image by block matching, the second block including the maximum number of pixels each indicating an absolute difference value not more than a first threshold with respect to each of the pixels of the first block;

computing a first motion vector between the first block and the second block;

extracting pixels in the first block that the first absolute difference value is not more than the second threshold as a pixel block of the first region;

extracting pixels in the first block that the first absolute difference value is larger than the second threshold as a pixel block of the second region;

extracting a third block from the second frame of the image by block matching, the third block including the maximum number of pixels each indicating an absolute difference value not more than a third threshold with respect to each of the pixels of the pixel block of the second region;

computing a second motion vector between the second region and the third block;

scaling the first motion vector and the second motion vector according to a temporal position of the third frame;

extracting an interpolation block and a fifth block according to the scaled motion vector, the interpolation block being on the third frame that is at spatially the same position as the block on the first frame and the fifth block corresponding to a locomotive point of a region interpolation block on the third frame that is at spatially the same position as the pixel block;

forming the interpolation image allocating the fifth block to the interpolation block of the third frame and the region interpolation block; and

displaying the original image and the interpolation image.

Claim 17 (Original): An interpolation picture generation apparatus which generates an interpolation picture to be interpolated in a third frame between a first frame and a second frame, the apparatus comprising:

a frame extraction unit configured to extract from the first frame a first block including a plurality of pixels;

a detection unit configured to detect a second block from a plurality of blocks of the second frame by block matching, the second block including the maximum number of pixels each indicating an absolute difference value not more than a first threshold with respect to each of the pixels of the first block;

a computation unit configured to compute a first motion vector between the first block and the second block;

a pixel extraction unit configured to extract pixels in the first block that the first absolute difference value is not more than the second threshold as a pixel block of the first region;

a pixel extraction unit configured to extract pixels in the first block that the first absolute difference value is larger than the second threshold as a pixel block of the second region;

a block extraction unit configured to extract a third block from the second frame by block matching, the third block including the maximum number of pixels each indicating an absolute difference value not more than a third threshold with respect to each of the pixels of the pixel block of the second region;

a computation unit configured to compute a second motion vector between the second region and the third block;

a scaling unit configured to scale the first motion vector and the second motion vector according to a temporal position of the third frame;

a block extraction unit configured to extract an interpolation block and a fifth block according to the scaled motion vector, the interpolation block being on the third frame that is at spatially the same position as the block on the first frame and the fifth block corresponding to a locomotive point of a region interpolation block on the third frame that is at spatially the same position as the pixel block; and

an interpolation forming unit configured to form the interpolation picture allocating the fifth block to the interpolation block of the third frame and the region interpolation block.

Claim 18 (Original): The apparatus according to claim 16, which further includes:

a block extraction unit configured to extract a third block including a plurality of pixels from the second frame;

a detection unit configured to detect a fourth block from a plurality of blocks of the first frame by block matching, the fourth block including the maximum number of pixels each indicating an absolute difference value not more than a second threshold with respect to each of the pixels of the third block;

a computation unit configured to compute a second motion vector between the third block and the fourth block,

a comparison unit configured to compare the maximum number of pixels of the second block and the maximum number of pixels of the third block;

a selection unit configured to select the first motion vector when the maximum number of pixels of the second block is larger than the maximum number of pixels of the third block; and

a selection unit configured to select the second motion vector when the maximum number of pixels of the third block is larger than the maximum number of pixels of the second block.

Claim 19 (Original): A display apparatus, comprising:

an extraction unit configured to extract from a first frame of an original picture a first block including a plurality of pixels;

a detection unit configured to detect a second block from a plurality of blocks of a second frame of the picture by block matching, the second block including the maximum number of pixels each indicating an absolute difference value not more than a first threshold with respect to each of the pixels of the first block;

a computation unit configured to compute a first motion vector between the first block and the second block;

an extraction unit configured to extract pixels in the first block that the first absolute difference value is not more than the second threshold as a pixel block of the first region;

an extraction unit configured to extract pixels in the first block that the first absolute difference value is larger than the second threshold as a pixel block of the second region;

an extraction unit configured to extract a third block from the second frame by block matching, the third block including the maximum number of pixels each indicating an absolute difference value not more than a third threshold with respect to each of the pixels of the pixel block of the second region;

a computation unit configured to compute a second motion vector between the second region and the third block;

a scaling unit configured to scale the first motion vector and the second motion vector according to a temporal position of the third frame;

an extraction unit configured to extract an interpolation block and a fifth block according to the scaled motion vector, the interpolation block being on the third frame that is at spatially the same position as the block on the first frame and the fifth block corresponding to a locomotive point of a region interpolation block on the third frame that is at spatially the same position as the pixel block;

an interpolation picture forming unit configured to form an interpolation picture allocating the fifth block to the interpolation block of the third frame and the region interpolation block; and

a display which displays the original picture and the interpolation picture.

Claim 20 (New): A method of detecting a motion vector comprising:

extracting, from a (m+k)-th frame assumed between a m-th frame (m indicates an integer) of an image formed of a plurality of pixels and a (m+n)-th frame (n is an integer not less than k + 1, k is a real number), a plurality of first blocks produced by dividing the (m+k)-th frame and each having a given size and a give shape;

extracting a plurality of second blocks each having the same size and shape as corresponding first blocks from the m-th frame;

obtaining first motion vectors between said first blocks and said second blocks;

calculating second motion vectors which are -(n-k)/k of the first motion vectors;

extracting from the (m+n)-th frame third blocks corresponding to destinations of the first blocks according to the second motion vectors;

obtaining absolute difference values between each of opposite pixels of the second blocks and the third blocks;

counting pixels having the absolute difference value not more than a threshold to obtain count values for pairs of the second blocks and the third blocks;

extracting a pair of blocks containing pixels for which the count value becomes maximum, respectively, from the pairs of the second blocks and the third blocks; and

obtaining as a motion vector between the m-th frame and the (m+n)-th frame a vector between the pair of blocks for which the count value becomes maximum.

Claim 21 (New): A method of detecting a motion vector, comprising:

extracting a first block including a plurality of pixels from a first frame between a second frame and a third frame;

extracting a second block including a plurality of pixels from the second frame, the second block having the same size and shape as the first block;

acquiring a first vector between the first block and the second block;

scaling the first vector to obtain a second vector between the first frame and the third frame;

extracting a third block including a plurality of pixels from the third frame according to the second vector, the third block having the same size and shape as the first block;

repeating the preceding steps to obtain a plurality of block pairs each including respective of the second and third blocks;

calculating an absolute difference value between each of opposite pixels of the second block and the third block for each of the block pairs;

counting pixels having the absolute difference value not more than a threshold to obtain a count value for each of the block pairs;

selecting from the plurality of block pairs a block pair having a maximum value of the count value; and

outputting the first vector and the second vector of the selected block pair as a motion vector pair for the first block.